

RTCA Special Committee 186, Working Group 3

ADS-B 1090 MOPS, Revision A

Meeting #7

**ACTION ITEM 4-4
Eliminate Range Based Decoding Requirements**

**Presented by Stacey Rowlan
Aviation Communications and Surveillance Systems**

SUMMARY
Recommended updates to sections 2.2 and 2.4 to eliminate range based decoding references and requirements.

BACKGROUND

Two methods for performing local CPR decoding, the Range Monitoring and the Emitter Centered methods were initially defined in the MOPS. In order to allow a 120 coast time (see WP-02-01) between position updates without requiring a globally unambiguous decode it was decided to eliminate the option for the Range Monitoring method. Changes were made to eliminate references to the Range Monitoring method in Appendix A (WP-05-01). The following recommendation is to eliminate references to the Range Monitoring method in Sections 2.2 and 2.4.

RECOMMENDATION

It is recommended that the following sections (2.2.8.4.1, 2.2.8.4.2, 2.4.8.4.1 and 2.4.8.4.2) be deleted from the MOPS.

2.2.8.4.1 Receiving Device Position – Latitude

If the Range Monitoring Technique is used for locally unambiguous decoding of tracked emitter position, as specified in section 2.2.8.1.2, then the Receiving Device shall accept own position latitude (WGS-84) as follows:

- a. Own position latitude shall be used to enable locally unambiguous decoding of position information encoded in ADS-B Airborne Position Messages (see paragraph 2.2.3.2.3) in accordance with sections A.7.4 through A.7.8.4 of Appendix A.
- b. Own position latitude shall be used to enable locally unambiguous decoding of position information encoded in ADS-B Surface Position Messages (see paragraph 2.2.3.2.4) in accordance with section A.7.4 through A.7.8.4 of Appendix A.

Note: Own position information can provide the information necessary to accomplish unambiguous decoding of Surface Position message data.

2.2.8.4.2 Receiving Device Position – Longitude

If the Range Monitoring Technique is used for locally unambiguous decoding of tracked emitter position, as specified in section 2.2.8.1.3, then the Receiving Device shall accept own position longitude (WGS-84) as follows:

- a. Own position longitude shall be used to enable locally unambiguous decoding of position information encoded in ADS-B Airborne Position Messages (see paragraph 2.2.3.2.3) in accordance with section A.7.4 through A.7.8.4 of Appendix A.
- b. Own position longitude shall be used to enable locally unambiguous decoding of position information encoded in ADS-B Surface Position Messages (see paragraph 2.2.3.2.4) in accordance with section A.7.4 through A.7.8.4 of Appendix A.

Note: Own position information can provide the information necessary to accomplish unambiguous decoding of Surface Position message data.

2.4.8.4.1 Verification of the Receiving Device Position – Latitude (subparagraph 2.2.8.4.1)

Purpose/Introduction

If the Range Monitoring Technique is used for locally unambiguous decoding of tracked emitter position, as specified in section 2.2.8.1.2, then the Receiving Device shall accept own position latitude (WGS-84) as follows:

- a. Own position latitude shall be used to enable locally unambiguous decoding of position information encoded in ADS-B Airborne Position Messages (see paragraph 2.2.3.2.3) in accordance with sections A.7.4 through A.7.8.4 of Appendix A.
- b. Own position latitude shall be used to enable locally unambiguous decoding of position information encoded in ADS-B Surface Position Messages (see paragraph 2.2.3.2.4) in accordance with section A.7.4 through A.7.8.4 of Appendix A.

Equipment:

Provide a method of simulating straight-line trajectories for the Transmitting and Receiving Aircraft given the initial conditions of the Data Set. Also, provide a method of structuring and transmitting valid ADS-B Position and Velocity messages given the information as calculated by the simulation of Transmitting Aircraft, and the ability to time tag the transmission. Also provide the capability to supply positional information of the Receiving Aircraft to the ADS-B receiver via the appropriate interface.

Measurement Procedure:

If the ADS-B receiver does not use the Range Monitoring Technique to locally decode tracked emitter position in accordance with section A.7.4 through A.7.8.4 of Appendix A, then this test procedure does not apply.

Data:

Transmitting Aircraft

Initial Latitude	45	degrees North		
Initial Longitude	45	degrees West		
Velocity	600	knots	East	

Receiving Aircraft

Initial Latitude	47	degrees North		
Initial Longitude	47	degrees West		
Velocity	600	knots	West	

Step 1: Initialization

Provide the ADS-B receiving device with Airborne Position and Velocity messages such that the device is in the Track State and is outputting State Vector Reports. Continue to provide Position and Velocity messages for another 10 seconds.

Step 2: Pause for the Cause

Stop providing all ADS-B messages to the ADS-B receiving device for 24 seconds. Generate a valid ADS-B position message with any Latitude and Longitude data that is less than 160 NM away from the receiving aircraft, but is more than 200 NM away from the position reported in the last State Vector Report provided to the Output Storage Buffer.

Retrieve the resulting State Vector Report from the Output Storage Buffer. Verify that the reported Latitude is less than 10.375 meters from the Latitude that was encoded into the last provided Airborne Position Message. Verify that the reported Longitude is less than 10.375 meters from the Longitude that was encoded into the last provided Airborne Position Message

Step 3: Repeat

Repeat above procedures using Surface Messages in place of Airborne Messages.

2.4.8.4.2 Verification of the Receiving Device Position – Longitude (subparagraph 2.2.8.4.2)

Appropriate test procedures for section 2.2.8.4.2 have been provided in section 2.4.8.4.1.